CHAPTER VI
NATURAL RESOURCES

INTRODUCTION

This Chapter describes the major elements of the natural environment that are within the Town of Sutton. The protection, conservation, and enhancement of the natural environment are important to the residents of Sutton.

To achieve the recommendations of this Chapter, the Town should not view this Plan as a static document that lays out precisely what needs to be done for the next ten years, although in some cases it is able to do just that. The idea is to steadily increase the information base regarding important issues, make that information available to the public and decision-makers in an accessible, clear, and consistent manner. From there, this information should be used not only to refine management plans, but also to target and prioritize the need for additional information. It is useful to think of this Chapter as adaptive in the sense that it can be adjusted as we learn more about the environmental systems in which we live.

SOILS

One of the most important natural resources and determinants of land use is soils. This is particularly important in Sutton, which has no public sewer or municipal water districts. Information about soil characteristics, with other supporting data, allows a community to make sound land planning decisions.

In addition to offering many environmental and agricultural benefits, soils are subject to contamination, erosion, and depletion at an alarming rate. Productive soils for farming and forestry are often prime development sites, that when built upon, become unavailable for those essential uses.

Soil is a collection of organic materials and minerals that reflects a combination of factors that formed it – climate, plant and animal life, parent materials, topography, and time. In New Hampshire, most parent material was deposited by glaciers or are glacial material that have been reworked and deposited as a result of the forces of wind and water.

Among the most restrictive soils, in terms of development potential, are the hydric soils. These soils form where there is water at or near the surface for at least several weeks. This extended period of saturation causes visible changes in the soils. Hydric soils are one of the three indicators used to identify wetlands and may be classified by their drainage class. Most hydric soils are considered poorly drained or very poorly drained. Other hydric soils are the very poorly drained soils, which have at least four inches of organic matter near the surface.

Hydric soils are mapped to an accuracy threshold of about 2 acres by the Natural Resources Conservation Service (NRCS). Determination of hydric soil areas for development purposes using NRCS data is not accurate enough, in most cases, to protect this resource.

Goal
To ensure that the soil resources in Sutton are taken into consideration when development proposals are reviewed.

Recommendation

- Amend the Subdivision and Site Plan Review Regulations, to require new developments to submit site-specific soil data to ensure that new developments have adequate carrying capacity for such proposed uses. Site specific data submittals should be consistent with best management practices and current technology.

SAND AND GRAVEL DEPOSITS

Large deposits of sand and gravel can be a valuable source of construction materials. Because of their permeability (the ability to allow water to flow through), sand and gravel deposits also tend to be good sites for water supply wells. Permeability also makes sand and gravel deposits very vulnerable to contamination; once contaminants are spilled or dumped, they can quickly spread. Therefore, special attention should be given to regulating land uses over sand and gravel deposits.

The Town of Sutton issues new permits for commercial sand and gravel excavation under New Hampshire State statute (RSA 155-E:4-a) and through the Zoning Board of Adjustment issuing licenses for new excavation operation (Section III B 1-3 of the Zoning Ordinance). The Board of Selectmen annually reviews the excavation sites for tax purposes, as does the NH Department of Revenue Administration.

There are currently 7 privately-owned sand and gravel pit operations and 1 state-owned gravel pit that will need to be reclaimed once all of the financially viable deposits have been removed. Reclamation means the restoring of an excavation site to a standard at least equal to those outlined in Town regulations. See the table below and the **Excavation Sites and Potential Sources of Contamination Location Map** for the locations of existing excavation sites within the Town.

Owner	Pit Size (Acres)	Location	Amount Excavated 2003 (cubic yards)	Pit Assessed Value 2003
Alan Wagner	1.0	Roby Road		$20,000
Alan Wagner	1.0	Roby Road		$20,000
NH Golf Course (for own use)	2.2	Baker Road		$44,000
Carol Dixon (Inactive)	5.0	Wilmot Road		$100,000
Donald E. Rowe	0.5	Cotton Road	5,305	$7,500
Christopher Scott Rowe	2.95	King Hill Road	3,100	$59,000
NH Fish and Game	9.4	Baker Road	5,650	Tax Exempt
Kenneth West	2.7	Shaker Street	1,925	$54,000

Source: Town of Sutton Assessor Database 2004

Goal
To effectively utilize spent excavation sites for conservation and recreation activities, where appropriate.

Recommendation

- The Town should look to buy/receive recreation or conservation easements at current excavation sites after reclamation takes place at appropriate locations, which can serve as recreational areas and/or provide water access for residents.

Goal
To ensure that all activities taking place at an active or inactive excavation site is appropriate and follows all state and local regulations.

Recommendations

- Any reuse of the sand and gravel pits located within the Town should be evaluated as to the appropriateness for the proposed activity, and best management practices should be used to prevent contamination of subsurface water bodies, as well as adjacent streams, ponds, rivers, and/or wetlands.
- Ensure that the Board of Selectmen are annually reviewing excavation operations to ensure compliance with State regulations.

WATER RESOURCES

This section on water resources includes information on surface water, groundwater, wetlands, and floodplains located in the Town of Sutton.

Surface Water
Surface water is an important part of the natural environment providing the Town with water, acting as retention/detention area, recreational areas, and as wildlife areas. Sutton contains many surface water bodies, as can be seen on the **Water Resources Map**.

The Town of Sutton lies within the Merrimack River principal drainage basin and the Contoocook River sub-basin, with the exception of the western face of Kings Hill in the northwest corner of Sutton, which drains into Lake Sunapee and the Connecticut River principal drainage basin. The northeastern 20% of the Town flows into the Blackwater River, while the remainder flows into the Warner River.

Cascade Brook originates in Winslow State Park in Warner. Baker Brook originates in Baker Pond in Sutton and flows into Cascade Brook east of Shaker Road in northeast Sutton. Cascade Brook then flows north to Wilmot Flat, where it empties into the Blackwater River.

The Warner River originates in Bradford and flows in an easterly direction through Warner before entering the Contoocook River in Hopkinton. One meander bend flows into Sutton along the southern boarder. At this bend is the confluence of Lane River. Beginning at Kezar Lake in North Sutton, Lane River flows south through Sutton Mills and South Sutton to the Warner River. Lyon Brook flows south from New London into Kezar Lake, with tributaries draining the eastern side of Kings Hill. Crate Brook and Kings Brook originate at the southern base of Kings Hill and flow into Lane River at Sutton Mills. Thistle Brook flows from just south of Gile Pond, along Route 114, and into Lane River just below Sutton Mills.

Newbury Reservoir and Blaisdell Lake feed small streams, which drain into the Warner River in Bradford. Stevens Brook begins near the intersection of Kearsarge Valley Road and North Road and flows along northeast side of Interstate 89 into Warner.

There are six state-owned public bodies of water within the Town of Sutton, which are described in more detail below.

Billings Pond
This natural pond is located in the southwest corner of Sutton, adjacent to the southern shore of Blaisdell Lake. Its 0.21 square mile watershed is contained within the watershed of Blasidell Lake and is part of the Warner River System.

Blaisdell Lake
The second largest lake in Sutton, Blaisdell Lake is used extensively for recreation activities in the summer. Many summer residences front its shores. Blaisdell Lake is a natural lake, which has been raised by damming, and drains a land area of 0.67 miles. It does not have free public access.

Gile Pond
Located south of North Sutton Village, this natural pond is bounded in part by Shadow Hill State Forest. It is also part of the Warner River system.

Kezar Lake
Kezar Lake is a 181.45 acre lake in North Sutton. Eighty-eight percent of the water in Kezar Lake comes from Lyon Brook, which itself is composed of Lyon Brook, Clark Brook and King Hill Brook. Kezar Lake is a significant public waterbody for the western section of the state,

supplying a moderately sized state park managed by the Department of Resources and Economic Development, many seasonal and year round homes, and a public access to the lake. This public access is also a public swimming beach, Horse Beach.

In 1931, a sewage treatment facility in New London, three miles from Kezar Lake, began to discharge treated effluent into Lyon Brook. In 1963 the first documented algae bloom occurred. "In 1968, the State Tax Commission ordered a 30 percent across the board reduction in appraised evaluations (Town Report of Sutton, New Hampshire, 1968)." In 1982, the New Hampshire Fish and Game Department purchased Chadwick Meadows, and altered the outlet structure to create a year-round wetland. The dam is managed for the benefit of Kezar Lake.

In 1990, as a result of lengthy litigation between the Town of New London and members of the Kezar Lake Protective Association, the Town of New London was ordered to pay $220,000 to the Association. In addition, a consent decree was entered into by both towns. The Town of New London was ordered to pay for up to two more treatments of the lake when certain water quality standards were not met. The court ordered that weekly sampling of the lake and its watershed be conducted jointly by the Town of New London and the Kezar Lake Protective Association, and that the Department of Environmental Services of the State of New Hampshire take additional samples monthly. In 1995, at the recommendation of DES, the Kezar Lake Watershed Committee was formed. Representatives of Sutton, New London, and DES meet periodically to monitor the entire watershed.

The New Hampshire Department of Environmental Services began to clean up Kezar Lake in 1979. A large EPA grant was given to the state to study and remediate the lake. Eventually, aluminum salts were applied to the lake. They bound with the phosphates, which were causing the algae blooms. The phosphates sank to the bottom, where they remain to this day.

Kezar Lake is not like any other lake. It is the most studied lake in the U.S. It has known phosphate deposits at its bottom, bound up with the aluminum salts. Additional phosphates could, at any point, result in the release of the existing phosphates. An algae bloom could then reoccur. The algae bloom from the past has been described as pea soup. The history of Kezar Lake, and its fragile condition, must be remembered when any land use activities in its watershed are considered.

Newbury Reservoir

Also known as the Loch Lyndon Reservoir, this artificial pond straddles the Newbury Town Line. Of the 127 total acres of this Reservoir, 90 acres are contained within Sutton.

Russell Pond

This natural pond is located ½ mile upstream from Blaisdell Lake. It is used in all seasons for various recreational activities. The Town recently purchased a 9 acre parcel of land with approximately 2,000 feet of frontage on the Pond.

	Area (acres)	Shoreline Length (miles)	Elevation (feet)	Average Depth (feet)	Max. depth sounded (feet)	Length (miles)	Width (miles)
Billings Pond	27	0.9	826	13	20	0.3	0.2
Blaisdell Lake	158	2.9	817	21	40	1.2	0.3
Gile Pond	57	1.2	902	8	10	0.4	0.4
Kezar Lake	182	2.1	906	NA	25	0.8	0.6
Newbury Reservoir	127	3.0	787	12	15	1.0	0.2
Russell Pond	15	0.6	851	6	8	0.2	0.1

Source: 1988 Sutton Master Plan

The Town has an obligation to protect its water quality. Conservation efforts in the past have helped to protect these resource values through the Town's ordinances and through the acquisition of conservation land or easements. 82% of the 1999 community survey respondents support the protection of lake and pond shoreline through ordinances and regulations. It is important for the Town to take proactive steps to ensure that the quality and aesthetic value of the surface water resources are protected, enhanced, and valued.

Groundwater

Groundwater is an important limited resource. Without adequate amounts of high quality groundwater, development will be restricted. Groundwater is the subsurface water, which saturates the soil and fills the cracks within the underlying bedrock. The top surface of this saturated zone is called the water table. In some locations, such as kettle hole ponds, the visible surface of the water may reflect the level of the groundwater of the adjacent land.

The groundwater is replenished largely by rainwater and snowmelt, which percolates downward through the soil. Other sources of replenishment, or recharge, may come from streams, lakes and ponds. Some groundwater flows to streams, ponds, and lakes and then becomes part of the surface water runoff. Although rainfall will percolate into all soil and weathered rock surfaces to some extent, areas of more porous sand and gravel will allow a greater amount of infiltration, and are specifically noted as "recharge zones" to signify their importance in recharging groundwater reservoirs. Therefore, it is important to identify and protect these areas from land uses that may be a significant threat of subsurface contamination.

If there is enough groundwater to provide an adequate water supply, that area of groundwater is called an aquifer. Most of the highly productive aquifers in New Hampshire consist of unconsolidated deposits of gravel and sand, floodplains, abandoned riverbeds and alluvial valleys.

In addition, if recharge areas are covered by development and impervious material, then the recharge of the underlying aquifers is reduced. The surface of the soil would be physically sealed by various materials such as asphalt or cement, which would not allow any water to penetrate the surface. This means that, not only would the recharge of the aquifer be impaired, but also there would likely be an increase in surface runoff and, therefore, an increase in the occurrence of floods. Because aquifers are such a valuable natural resource, they should be protected. 82% of the 1999 survey respondents favor preserving and protecting water supply lands through regulations and ordinances.

Sutton contains one aquifer with high potential to yield groundwater. This aquifer is located near North Sutton Village. The largest stratified drift aquifer in Sutton is located in the eastern half of Town in an elongated strip from Cascade Marsh to Steven Brook. This aquifer has medium potential to yield groundwater but due to its shape and location, it is probably not a good candidate for a public water supply. Another aquifer with medium potential to yield groundwater lies on the west side of Route 114 from South Sutton to Sutton Mills. Water quality here may have been affected by the original landfill site, a septage disposal site, the burial of ashes from the solid waste incinerator, and road salting on Route 114. See the **Water Resources Map** for the known aquifer locations in Sutton.

Wetlands

Wetlands are identified based on three indicators: the presence of water at or near the surface during part of the growing season, the presence of hydric soils, and the prevalence of vegetation adapted to grown in wet areas. Wetlands include, but are not limited to swamps, bogs, marshes, vernal pools, and similar areas.

Many wetlands have water present because the soils are poorly drained or the water table is very close to the surface. Sutton has a significant number of wetlands. The primary impacts facing wetland resources in Sutton today are the effects of development in their buffers or in the wetlands.

77% of 1999 survey respondents felt that the Town should preserve and protect its wetlands through its regulations and ordinances.

Wetlands have been viewed in the past as areas with little economic value and have been subjected to filling, draining, and dumping with little regard for the consequences. In recent times, however, it has been shown that wetlands provide benefits to the community. Wetlands provide numerous functions and values, some of which are listed below.

1) Flood Control – Some wetlands act as a giant sponge during periods of high run-off or flooding and then release this stored water slowly during drier periods.
2) Water Storage and Groundwater Recharge - The water in the wetlands can move up by means of evaporation, laterally by flowing in streams, and downwards, thus recharging groundwater.
3) Erosion and Sediment Control - Because wetlands vegetation absorbs or retains and slows down the rate of runoff, the water's erosive powers are decreased, and the sediment settles out of the water.

4) Pollution Filtration - Wetlands vegetation and microorganisms reduce the harmful potential of pollutants such as organic material, bacteria, nitrates, and phosphates found in water.
5) Wildlife - Wetlands vegetation and water provides food, habitats, and breeding grounds for a wide variety of wildlife.
6) Education and Recreation - Wetlands provide natural areas of study for all ages. Wetlands serve as excellent sites for photography, canoeing, snowshoeing, hiking, fishing, and hunting.
7) Environmental Health and Diversity - Generally, only wetland plants can tolerate wet soils and only certain types of animals and wildlife can tolerate such an environment.

See the **Water Resources Map** for more information and the locations of wetlands in Sutton.

Floodplains
Floodplains are areas of land bordering a river or stream that flood periodically. Floodplains are important for at two major reasons: 1) they carry floodwaters, and 2) they provide valuable wildlife habitat. By trapping sediments and reducing erosion, undeveloped floodplains play an important role in preventing pollution of rivers and streams. See the **Water Resources Map** for the location of the floodplain in Sutton.

As development occurs in an upstream watershed the runoff volume and rate of flow increase due to the larger areas of paved and other impervious surfaces (e.g. roofs, roads and driveways). Flooding can consequently become more frequent and floodwaters more damaging since they are moving faster. Preserving floodplains becomes increasingly important as uplands are developed, as does attention in local Ordinances to minimizing the amount of impervious surfaces in these floodplains. 77% of the 1999 survey respondents felt that the Town should protect and preserve floodplains through its regulations and ordinances.

Retaining a floodplain in its natural state, is the most cost-effective way to reduce flood damages, and has been found to be far less expensive than dams, channelization, and other structural methods. Undeveloped floodplains also trap sediments and pollutants and reduce erosion. Since protecting a floodplain helps to reduce water pollution, development within the floodplain leads to more rapid movement of pollutants into the stream channel, which degrades the quality of the water.

Goal
To ensure that the water resources in Sutton are protected through voluntary and regulatory efforts.

Recommendations
- The Conservation Commission should help educate the public on the proper maintenance of septic systems, pet waste management, livestock waste management, water conservation, and low-water landscaping.
- The Town should provide for comprehensive protection of shoreland and surface waterbodies through regulatory, educational, and voluntary efforts.

- The Town of Sutton should annually update its ordinances and regulations to adequately address the issues of stormwater management and erosion and sediment control in order to improve the quality of the Town's waterbodies to incorporate best management practices and technologies.
- Develop an Aquifer Protection Overlay Zoning District to help guide development where this resource is present.
- Research other road de-icing methods, besides the use of road salt, in some or all parts of Town to minimize this type of contamination.
- Ensure that all development proposals comply with the NH Shoreland Protection Act.
- Consider adopting a maximum impervious surface requirement into the Zoning Ordinance that would limit the amount of impervious surface per parcel in an effort to reduce runoff.

Goal
Provide for the protection of wetlands during land development activities.

Recommendations
- When evaluating development proposals that affect wetlands, the entire wetland system should be considered, instead of just the specific acreage of wetland being directly impacted.
- Develop a Wetlands Overlay Zoning District to help guide development when this resource is present.

Goal
To meet the federal requirements for Sutton's participation in the National Flood Insurance Program.

Recommendation
- Annually review the Floodplain Development Ordinance to ensure best management practices are being followed and that the recommendations outlined in the Community Assistance Visit are implemented.

POTENTIAL SOURCES OF CONTAMINATION

All types of development have the potential to contaminate surrounding natural resources, especially water resources. This contamination can come in two forms, point-source pollution and non-point source pollution. Point-source pollution is pollution where the source can specifically be determined, such as a leaking underground storage tank. Non-point source pollution is pollution that comes from multiple sources and activities and not be attributed to one incident or location. An example of non-point pollution is sedimentation of a waterbody.

Point Source Pollution
According to the NH Department of Environmental Services OneStop data source (July 2004), there are over 25 potential locations of point-source contamination that exist in Sutton. Point sources of contamination refer to the fact that the point of contamination can be determined,

unlike other types of contamination such as runoff. These contamination sources include properties that have underground storage tanks, landfills, are hazardous waste generators, are old dump sites, as well as others. See the **Excavation Sites and Potential Contamination Sites Location Map** for more information on these locations.

Non-point Source Pollution
Much of the non-point source pollution occurring in Sutton is impacting surface water bodies – lakes, rivers, and ponds. There are various sources that can contribute to this type of pollution, including septic systems, pet and domestic animal waste, lawn and garden care, impervious surface runoff, and land disturbance during land development activities. Many of these items have been addressed in the Water Resources section of this Chapter.

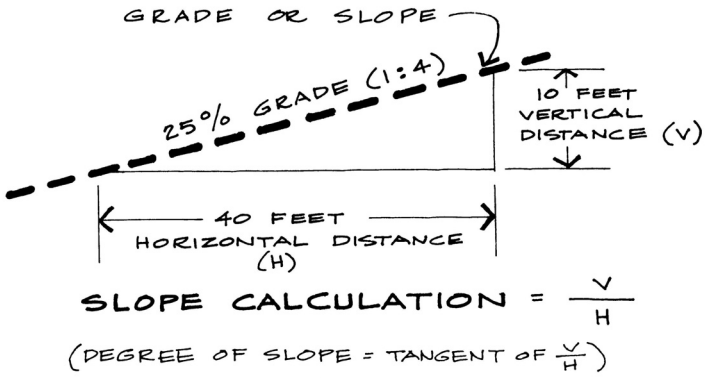
Goal
To ensure clean, safe, and available drinking and surface water for the residents of the Town.

Recommendation

- To develop and adopt an Aquifer Protection Overlay District that would prohibit uses that could be potential sources of contamination.
- To research the creation of a Kezar Lake Watershed Overlay District that would regulate uses within the watershed to maintain and protect water quality.
- To research the creation of other Watershed Overlay Districts, in addition to a Kezar Lake Watershed Overlay District.

SLOPES
Slope is a very critical consideration in land use planning because it affects the capability and suitability of land to support development, as it relates to the site and the building, septic system and building design costs, and environmental impacts. Environmental impacts include such things as runoff, erosion, sedimentation, and pollution. 60% of the 1999 survey respondents felt that the Town should preserve and protect steep slopes through its regulations and ordinances.

Slope is the ratio of change in vertical elevation in relation to the change in horizontal distance, multiplied by 100 percent.



Source: The Illustrated Book of Development Definitions
Harvey S. Moskowitz and Carl G. Lindbloom, 1993

There are four slope classifications, which are presented below. In Sutton, the majority of land has a slope of less than 25%. There are, however, a few areas with steep slopes, as can be seen on the **Slopes and Scenic Viewpoints Map**.

Slope Classification	Description
Gently Sloping (1-10%)	Suitable for many uses; are not prohibitive for development and make for excellent natural drainage conditions
Moderately Sloping (11-25%)	May be restrictive for certain land uses; low density residential development is feasible
Steep Slopes (26-35%)	Excavation and grading are almost always required; development not intensive in its coverage may be accommodated with limited environmental impact
Very Steep Slopes (Over 35%)	Subject to adverse environmental impacts and heavy construction costs; intensive use of land should be done cautiously

Careful development of land with steeper slopes is important to reduce the potential negative impact on stormwater runoff, wildlife habitat, and abutting properties.

Goal
To ensure that land with steep slopes is developed in a way to minimize negative environmental impacts.

Recommendations

- The Planning Board should encourage developers to protect the naturally occurring steep slopes with slope easements.
- The Planning Board should adopt slope development criteria to ensure the protection of the environment and public safety in both the short and long term**.**

SCENIC VIEWPOINTS

The landscape of a community defines its cultural, natural, and historical heritage and thus provides the residents of a community with a sense of identity. 74% of the 1999 survey respondents felt the Town should preserve and protect scenic hilltops through its ordinances and regulations. The quality and importance of a scenic resource varies widely according to the physical prominence of the features in question, the viewing possibilities, and the number of persons able to enjoy the views and vistas.

In 2001, the Sutton Master Plan Committee selected 22 key viewpoints from around town. The viewpoints were chosen based on a consensus of the committee members after identification of important views and features in the Town and should not be considered an exhaustive list. This analysis sought to identify and include views from places where people live, gather, and move through the Town. Thus, emphasis was placed on views from commonly traveled roadways, villages, and important open areas of the Town, such as lakes, farm fields, and wetlands.

The results of the scenic viewpoint analysis can be seen in the list below and on the **Slope and Scenic Viewpoint Map**. The viewpoints listed below are locations from which scenic views can be seen, not the scenic views themselves. **Appendix C** contains an analysis of key landscape features which can be seen from each scenic viewpoint.

1) Route 114 at Little Britton Road
2) Kearsarge Valley Road at the Town Line
3) Kearsarge Valley Road at the Country Club of NH
4) Exit 10 at North Road and I-89
5) Muster Field Farm/Matthew Harvey Homestead on Harvey Road
6) Horse Beach on Kezar Lake
7) Intersection of Corporation Hill Road and Main Street in Sutton Mills
8) Old Newbury Road at the Newbury Reservoir
9) Route 114 in South Sutton at Roby Road
10) I-89 northbound 1¾ miles north of the Warner Town line
11) Route 114 at Russell Pond
12) Route 114 at Blaisdell Lake
13) Eaton Grange Road at Sutton Lane
14) Baker Hill Road ¾ mile south of the Town Line
15) Poor Farm Road ¼ mile south of King Hill Road
16) Wadleigh Hill Road at Pressey Bridge
17) Gile Pond Road at Gile Pond
18) Rest stop on I-89
19) Meetinghouse Hill Road ¾ mile north of the Village of South Sutton
20) Birch Hill Road ¾ mile east of Roby Road
21) Route 103 ½ mile east of Roby Road
22) Blaisdell Hill Road ½ mile north of Town Line

Sutton has a diversity of scenic views and vistas, most of which are protected only by the willingness and desires of the landowners. As more development occurs within the Town, the scenic views, and locations to observe such views, will become more endangered.

Goal
To preserve scenic views from development that will negatively impact their scenic attributes.

Recommendations

- The Town should approach the landowners whose property is considered to be part of a scenic viewpoint and discuss the donation or purchase of a scenic easement to protect this resource.
- The Planning Board should amend their Site Plan and Subdivision Regulations to include incentives for developers to protect scenic views when proposing a subdivision or site plan.
- Undertake a comprehensive scenic viewpoint and viewshed analysis that would include pictures and criteria for inclusion in the analysis.

FLORA AND FAUNA

Wildlife

The challenge of conserving enough habitats to support healthy native wildlife populations is complicated by the varying habitat requirements of the number of diverse species located in Sutton. Some species require less than an acre of undisturbed forest, while others need territories covering a hundred acres. In addition, many species require several different habitat types through the course of the year. The more habitat diversity within the region, the more likely it will support a diverse and abundant wildlife population.

A major threat to wildlife diversity is sprawling development patterns that cover the rural landscape, which cause habitat fragmentation through residential lawns and roads. Wildlife that are sensitive to human encroachment are restricted to these islands of undisturbed land and they may move or die out if an area becomes too small. The fragmentation of wildlife habitat may also result in a loss of native plants, a reduced breeding gene pool, a loss of natural predators, and an increase in animals' susceptibility to disease.

For optimum wildlife habitat, blocks of unfragmented land should be void of significant human activity or development. Unfragmented lands often encompass many habitat types and can also provide safe travel corridors and migratory pathways. Reducing the size of forest tracts affects many species, even if all other habitat features remain the same. Fragmentation of undisturbed habitats with roads represents a source of mortality and creates barriers to wildlife movement.

84% of the 1999 survey respondents felt that wildlife areas should be preserved and protected through regulations and ordinances.

Corridors and greenways are typically used not only by people for recreation and transportation, but also by wildlife to travel from one habitat to another. Maintaining viable and undeveloped corridors ultimately measures the biological success of the animals, particularly larger mammals within an area. The more biodiversity found within an area, the more valuable and self-sustaining the community becomes from both ecological and economic perspectives.

The NH Fish and Game Department has completed a coarse filter analysis of potential significant wildlife habitat for the state based on a protocol modified from that outlined in the manual "Identifying and Protecting New Hampshire's Significant Wildlife Habitat" (Kanter et al. 2001). There are three maps created for this project, which are available at Town Hall. The maps include a Base Map, a Habitat Features Map, and a Co-Occurrence Scores Map. This study, in addition to other wildlife habitat studies, can be useful to guide conservation strategies for the Town. NH Fish and Game hopes to complete their analysis by Fall 2005 for the state.

The size of a species population is usually dependent on the amount and location of suitable habitat. Animal populations can often be manipulated by varying the amount of available habitat. However, unless a species is rare and endangered, one species should not be favored over another. Providing a variety of habitats and protecting them from development and negative environmental impacts will increase wildlife diversity in Sutton.

Invasive Species
Sutton is fortunate to have a diversity of fauna and flora, but invasive species present a threat to the many of the plants and animals in the region and also to the economic value of property. "Invasive species means an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health" (NH Department of Agriculture). There are several alien invasive plant species present in the town of Sutton that are of particular concern: Purple Loosestrife, Phragmites, milfoil, Japanese Knotweed, and European Bittersweet. See **Appendix D** for more information on these five types of invasive species currently present in Sutton.

Species of Special Concern
The Natural Heritage Bureau, in the NH Division of Resources and Economic Development's Division of Forest and Lands, maintains a database of known rare plant populations, rare wildlife populations, and exemplary natural community occurrences. Exemplary natural communities are distinctive communities of forests, wetlands, grasslands, etc., that are found in few other places in New Hampshire, or are communities that are in good condition.

The Natural Heritage data (which is updated periodically) represent the current documented information for the location and status of species of concern and natural communities in New Hampshire, but all significant plant and animal species have not yet been documented since a comprehensive natural resources inventory of the Town has not been done.

Flag*	Species or Community Name	Threatened or Endangered – State	# Reported in Sutton in Last 20 Years
Natural Communities - Palustrine			
	SNE Acidic Seepage Swamp		Historical
Plants			
Very High Importance	Atlantic White Cedar (Chamaecyparis thyoides)		1
	Ciliated Willow-Herb (Epilobium ciliatum)	Threatened	Historical
Vertebrates - Birds			
Very High Importance	Great Blue Heron (rookery) (Ardea herodias)		2
High Importance	Least Bittern (lxobrychus exilis)	Endangered	1
Very High Importance	Northern Harrier (Circus cyaneus)	Endangered	1
High Importance	Pied-Billed Grebe (Podilymbus podiceps)	Endangered	1

Vertebrates - Reptiles			
Very High Importance	Blanding's Turtle (Emydoidea blandingii)		1
Very High Importance	Wood Turtle (Glyptemys insculpta)		1

Flag indicates very high importance based on a combination of
1) How rare the species or community is and
2) How large or healthy its examples are in that town.

Source: Natural Heritage Bureau, July 2004

Goal
To promote the conservation and development of land in a manner that supports wildlife habitat.

Recommendations
- Encourage more property owners, including the Town, to manage their properties for wildlife habitat.
- Educate landowners on wildlife corridors and land management techniques that they can employ to help maintain and enhance these areas.
- Inform landowners, using town sources of information, about wildlife habitat conservation programs, such as the New Hampshire Coverts Project and the Wildlife Habitat Incentives Program (WHIP). Encourage the Conservation Commission to participate in these programs.

Goal
To protect those Species of Special Concern that may exist in Sutton.

Recommendation
- A public education campaign should be carried out and/or combined with other efforts to educate the public about the presence of endangered, threatened, and/or species of special concern located within the Town of Sutton, and the environmental and societal benefits for preserving such species.
- The Town should, where possible, acquire conservation easements or purchase the land where species of concern exist. Special priority should be given to those lands that connect currently protected parcels of land in the Town or abutting Towns.

Goal
To ensure proper protections from the introduction and spreading of invasive plant species in Sutton.

Recommendation
- Work with the New Hampshire Department of Environmental Services to do public education in Sutton about milfoil, *Phragmites*, purple loosestrife, and other exotic species.
- Encourage programs that inspecting boats entering the water to avoid the spread of milfoil.

- Post information about milfoil and other aquatic invasive species at boat launches on bodies of water in Town.
- Post links to information on invasive species on the Town website.

FORESTS

Sutton is a predominantly forested community. Forests serve a number of functions in both the community and the region, including protecting public water supplies and watersheds, serving as a source of renewable energy, providing lumber and other forest products, wildlife habitat, providing outdoor recreational opportunities, and contributing to the rural character of the community.

While a small percentage of Sutton's forestland is state and town owned, the majority is owned by private individuals and woodland investors. The Sutton Town Forest system contains 1 lot that totals approximately 74 acres of forest and wetland and is located in North Sutton. This town forest is managed for wildlife, recreation, and aesthetics.

A Tree Farm is a privately owned forest managed to produce timber with added benefits of improved wildlife habitat, water quality, recreation, and scenic values. To qualify as a tree farm, a landowner must dedicate at least 10 acres to growing and harvesting forest products, have a written plan for the future management of their forest, follow management recommendations, and demonstrate a commitment to stewardship of their forest for multiple values. Of all of the woodlots in Sutton, 13 are certified New Hampshire Tree Farms that include 1,482-acres (from New Hampshire Tree Farm data, April 2004) and can be identified through the green and white diamond-shaped signs on each property. This voluntary certification recognizes landowners who are good stewards of their property and who meet the standards of both the National Tree Farm certification as well as the state standards.

Forest management is also found on non-Tree Farm properties in Sutton and there are also instances of rampant logging. While the heavily logged areas may appear to be the norm as they have the largest visual impact, they may actually be the exception to the normal practice in Sutton.

Forest management includes timber production but also wildlife habitat management, water quality control and recreational opportunities. 77% of the 1999 survey respondents felt that the Town should preserve and protect land for forestry through its regulations and ordinances. The town can encourage sound forest management on public properties through the development of written forest management plans with well-defined prescriptions all geared toward complete forest management. The plans should be put into action with stand treatments being done according to Best Management Practices for Timber Harvesting. Private landowners, too, can be encouraged to implement forest management on their own properties through landowner education, by hosting woodlot tours on publicly managed lands, and through the posting of workshops and woodlot tours offered to the public. The State of New Hampshire already encourages forest management on private lands through Current Use Assessment with the tax incentive category of Forestland With Documented Stewardship.

New Hampshire has a real estate tax and timber is considered to be real estate. Timber is taxed only at the time it is cut and at a rate that encourages the growing of timber. Timber on all land is taxable at 10% of the assessed stumpage value (standing timber value) at the time of cutting. Yearly timber tax totals have fluctuated over time, as can be seen in the table below. The tax collected goes into Sutton's general fund, according to RSA 79.

Year	Timber Tax Collected
1994	$40,467
1995	$15,156
1996	$28,190
1997	$32,141
1998	$16,855
1999	$39,631
2000	$42,340
2001	$27,374
2002	$37,908
2003	$11,466

Source: Sutton Town Reports

Goal
To ensure that Town-owned forest land is managed properly and is available for resident use.

Recommendations

- A Town Forest Management Plan should be developed in order to have a plan in place for the management of this town resource. The public should be involved in the process to ensure that all concerns regarding the management of the Town Forests are addressed.
- The Town-owned forests should be used to provide residents with public land for outdoor recreational activities.
- The Town Forests should be managed as a multiple-use resource where consideration is given to timber harvesting, recreational opportunities, wildlife habitat, watershed protection, education, and preservation.

Goal
To promote good forest management throughout the Town.

Recommendation

- Forest management information should be made available by the Town to private woodland owners to encourage long-term planning and consideration of all aspects of the forest ecosystem, including wildlife and watershed concerns. UNH Cooperative Extension for Merrimack County is an ideal source for forest management information.

CONSERVATION LAND AND OPEN SPACE

Open Space

In its simplest definition, open space is land that has not been developed or converted to other uses. They include forests, fields, river corridors, wetlands, wildlife habitat, and greenway corridors, as well as agricultural lands and town parks. These are features that make Sutton a special place to live.

Open space is a very important part of any community. Open land can be used for commercial, recreational, and relaxation activities. It provides aesthetic and scenic values, wildlife habitat, and helps to minimize urban sprawl. Recreational opportunities on open land include walking, hunting, fishing, biking, wildlife viewing, and photography, just to name a few. In addition, open land costs the town less than developed land. In 1998, a Cost of Community Services Study was conducted in Sutton and it found that for every dollar generated in revenue from open space, only twenty-one cents were expended in services.[1]

One of the essential reasons to plan for open space is to set a course for the Town of coordinated development that maintains the Town's high quality of life. Many times decisions are made on land use without the benefit of a unifying plan to coordinate the actions. The result is haphazard development that disregards the Town's and/or region's unique characteristics and sense of place.

Greenways

Greenways are corridors of open space managed for conservation and recreational purposes, that may be permanently protected land. Greenways often follow natural land or water features, and link nature reserves, open space, farms and forest land, parks, cultural features, and historic sites with each other, as well as with populated areas. Some greenways may be publicly owned, some may be privately owned, and some are the result of public/private partnerships. In more developed areas, greenways can encompass natural or built features and can be managed primarily for resource conservation or recreation.

In more rural areas, greenways are natural corridors linking large unfragmented natural areas, preserving wildlife habitats and migration routes. Greenways serving as wildlife corridors can be virtually any type of traversable land, preferably of at least 200 feet in width. Common tracts of land that can be used as greenways include Class VI roads, railroad rights-of-way, and buffer areas along agricultural/forestry lands. Creating and maintaining a greenway system will help prevent those parcels of open space, which include forest, wetland, and agricultural lands, from becoming isolated islands, detached from one another and surrounded by development.

The Sunapee-Ragged-Kearsarge Greenway (SRKG) is a 75-mile emerald necklace of hiking trails surrounding Lake Sunapee, Ragged and Kearsarge Mountains and maintained by the SRKG Coalition. The Greenway passes through the Towns of Andover, Danbury, Newbury, New London, Springfield, Sunapee, Sutton, Warner, Goshen, and Wilmot

[1] "Town of Sutton New Hampshire Cost of Community Services Study" Sutton Cost of Community Services Ad Hoc Study Committee, December 1998.

SRKG's mission is to create and maintain a forever green, circular loop of trails and conserved lands providing hikers with access to the mountains, lakes, vistas and historical sites of the region. The "necklace" comprises over 75 miles of trails, created with the cooperation of landowners, state, and local authorities, through the forests, over mountains and, where appropriate, via old roads, now unsuitable for wheeled traffic but more extensively used as much as two centuries ago. Maintaining the Greenway, improving its pathways and creating new ones, some to form links with other famous hiking areas such as Monadnoch and Cardigan mountains, are undertaken by SRKG members.

Protected Open Space and Conservation Lands

The Town owns a number of parcels of land, many of which are managed by the Conservation Commission as open space. The State of New Hampshire, as well as many other non-profit conservation organizations, also own land or hold conservation easements on land within Sutton. The table below, as well as the **Conservation Land Map**, shows these parcels of conservation land in Town.

Map/Lot	Location	Name	Acres*	Easement Holder
State Owned Lands in Sutton				
5-897-562 5-835-595 7-818-035	Gile Road and Gile Pond Road	Shadow Hill State Forest	35.10	NA
8-053-139 8-129-044	Wadleigh Hill Road and Penacook Road	Wadleigh State Park	41.44	NA
8-082-269	Kezar Lake	Loon Island	0.67	NA
10-081-189	Hominy Pot Road	Chadwick Meadows	60.0	NA
7-342-574 7-348-428 7-239-337 7-298-414 7-299-477 9-299-057 9-378-030 9-345-208	Kearsarge Valley Road, Baker Road, and Cotton Road	Cascade Marsh Wildlife Management Area	325.10	NA
Land Owned by the Town of Sutton				
1-113-554	North Road and I-89	Stevens Brook-Cloues Natural Area	23.60	NA
3-126-029	North Road	Redington Dam Area	0.50	NA
4-070-198	Off Eaton Grange Road	Sprout Lot	4.10	NA
4-391-036	Route 114/Russell Pond	Spiers Lot	9.10	NA
6-068-565	Wadleigh Hill Road	Town Forest	75.00	Deed

		Tree Farm		Restrictions
6-038-545	W/S Route 114	Town Wetland Smiley (Aqua Villa) Property	25 (31)	NA
7-926-552	Route 114, No. Sutton	Enroth Gift	7.10	NA
8-018-340 8-018-336	Keyser Street & Kezar Lake	Mildred Lefferts Natural Area	5.20	Deed Restrictions
8-109-368	Keyser Street and Penny Ante Alley	W&L Sundell Natural Area	3.80	NA
8-369-498	Hominy Pot Road	King Hill Reservation	441.00	ASLPT
5-821-512	Southfield Road	Settlers Oven Site	1.23	Deed Restrictions
8-171-362	Off Park Ave, on Kezar Lake	Seymour Natural Area	3.90	NA
Private Lands with Conservation Easements				
8-113-444 9-909-051 9-982-168 10-124-023 10-135-141	Harvey Road Hominy Pot Road Lovers Lane	Muster Field Farm & Museum	251.70	SPNHF SPNEA
9-823-463 9-835-539	Rt.11 and Old Coach Road	Emerson Conservation Easement	31.51	ASLPT
8-191-357	Keyser Street and Penacook Road	Enroth Conservation Easement	38.86	ASLPT
6-068-417 6-121-485 6-098-266	Wadleigh Hill / Corporation Hill Roads	Keith Conservation Easement	116.30	SPNHF
3-113-102	North Road	Bing/Freeman Conservation Easement	18.8	SPNHF
1-338-510	Birch Hill Road	Bing/Freeman Conservation Easement	238.10	SPNHF
3-544-195	Eaton Grange Road	Bing/Freeman Conservation Easement	17.80	SPNHF
3-336-192	North Road	NA	2.00	NA
9-404-031	Off Shaker Street	Holland	117.85	NHLCIP

Source: Town Assessor, Town Reports, Betsy Forsham (8/14/04) * Approximate acreage
ASLPT – Ausbon Sargent Land Preservation Trust SPNHF – Society for the Protection of NH Forests
SPNEA – Society for the Preservation of NE Antiquities NHLCIP – NH Land Conservation Investment Program

73% of the 1999 survey respondents and 75% of the 2004 survey respondents favor spending tax dollars to protect or acquire natural resources through purchase or conservation easement.

Current Use Tax Program

Current Use is a property tax incentive to encourage landowners to keep open space undeveloped. Land that is participating in the Current Use Program is taxed on its potential to generate income in its existing, or current use. The alternative taxing strategy would be to tax the land on its income producing potential at the most highly developed use that could take place on it, such as a housing development or commercial business venture.

Landowners who have qualifying land must apply to the Town to participate in the Program. Lands which typically qualify for the Current Use Program include farm land, forest land, tree farms, certain wetlands, and other undeveloped areas over 10 acres in size, as well as qualifying farmland and discretionary easements. An additional tax benefit can be added to Current Use land if recreational uses are allowed. Landowners can post all or part of their Current Use land for no trespassing, as well as post against certain types of uses (ATVs, hunting, snowmobiling, etc.) (RSA 79-A).

Over the last ten years, the Current Use program has been embraced by the residents of Sutton. Over 60% of the total land area in Town has been enrolled in the Current Use program annually, as can be seen below.

	# Acres in Current Use
1994	16,723
1995	16,362
1996	17,425
1997	17,735
1998	17,799
1999*	18,040
2000*	18,043
2001	17,520
2002	17,545
2003	17,452

Source: Sutton Town Reports

* Figures count tax-exempt land in Current Use, which is not accounted for in the other years totals

When land that has been participating in this program is developed and/or no longer meets acreage requirements, a Land Use Change Tax (LUCT) is charged. The Land Use Change Tax is set at 10% of the assessed market value of the land at the time the change occurs. Since 2002, one-hundred percent of the proceeds from the Land Use Change Tax are dedicated to open space purchase through the Conservation Commission. The table below shows the LUCT amount that has been assessed since 1994.

1994-2003 Land Use Change Tax Assessed

1994	NA
1995	$2,434
1996	$1,480
1997	$600
1998	$5,704
1999	$33,592
2000	$27,252
2001	$5,041
2002	$32,236
2003	$5,797

Source: Sutton Town Reports

Goal
To have the Town identify, acquire, and maintain conservation land/easements in Sutton.

Recommendations

- The Conservation Commission should identify and prioritize potential parcels of land that the Town feels should be protected because of important cultural, ecological, historical, recreational, or scenic value.
- The Town should annually set aside funding into a capital reserve fund, which would be separate from the Land Use Change Tax funding, for land conservation activities associated with easement or land purchase.
- A management plan should be created for each easement or piece of property the Town owns to ensure that the conditions of the easement/sale are being met.
- There should be consistent signage for all Town-owned Conservation Land.

Goal
Provide incentives for landowners to maintain their property as open space or conservation land.

Recommendation

- Provide information to all eligible landowners about the Current Use Program
- Provide information to interested landowners that encourages the donation of easements for agricultural lands, conservation lands, forestry lands, and open space lands to the Town or other eligible organizations.

RECREATION

One of Sutton's most attractive and admired qualities is its recreational opportunities. These opportunities include trails, surface water resources, and bicycle lanes.

Trails
Trails create opportunities to access open land in the community and allow residents to get outdoors to access natural, scenic, and recreational areas. Trail-users include pedestrians, hikers,

equestrians, mountain bikers, snowmobilers, and ATV riders, just to name a few. A multi-use trail is defined as any trail that is used by more than one user group or for more than one trail activity. Many trails allow for multiple uses but may be posted for no trespassing during certain seasons or for specific types of trail uses.

Trails are can be classified as official or unofficial, permanent or temporary, seasonal, and single-use or multi-use. Examples of official trails are those owned and/or maintained by the federal, state, or town government and examples of unofficial trails are Class VI roads. An example of a permanent trail includes those located on the Muster Field Farm property while temporary trails include x-country ski trails. Seasonal trails are those trails that are maintained, used, or exist in a specific season, such as snowmobile trails in winter. Single-use trails are those that are created and maintained for a specific user group, such as equestrians, while multi-use trails can accommodate more than one user at a time.

Snowmobiling

Sutton has a local non-profit snowmobile club, the Sutton Ridgerunners, which was formed in 1970 and has over 80 members. The Ridgerunners maintain approximately 40 miles of trails in Sutton for snowmobile use. All of the snowmobiling trails within Town are for winter snowmobiling use only, except where posted by private property owners. These trails are developed through annual agreements with local landowners and are maintained by Sutton Ridgerunner volunteers.

Class A Trails[2]

A Class VI road is one types of rights-of-way to consider for an officially designated recreational trail system because the pathway has been established and public access is allowed. Typically, Class VI Roads are public rights-of-way that are used for recreational purposes, for through travel, for driveway access, and for other uses, such as agricultural and forestry uses. The owners of the properties abutting the Class VI road are not liable for damages or injuries sustained to users of the road, although they may choose to maintain the road for access to their property.

In 1993, the State enacted RSA 231-A, which allows municipalities to designate Class V and VI roadways as "Class A" trailways. With such a designation, the roadways are established as municipal trails. This designation will create ownership and responsibility for the trail by the Town. Class A Trails allow abutting landowners continued use of the right-of-way for vehicular use to existing structures, timber, or agricultural operations, but any new building or development is prohibited. The abutting landowners may be eligible for damages as per RSA 231-A:2(II).

Class A trails can be established at the annual Town Meeting by including a warrant article on the specific proposal and needs a simple majority in order to pass. In addition, Class A status can be rescinded through a vote at the Town Meeting.

[2] For more information in Class A Trails, see *A Hard Road to Travel: New Hampshire Law of Local Highways, Streets and Trails;* Local Government Center; pg 151-164. 2004

Water Access
Sutton has numerous lakes, rivers, and ponds. These provide opportunities for swimming, boating, fishing, and wildlife viewing. It is desirable for the people of Sutton to have access to these resources. Some access to Kezar Lake is available through Wadleigh State Park and "Horse Beach." There is no free public access to Blaisdell Lake. See the Water Resources section of this Chapter and the **Water Resources Map** for more information.

Bike Lanes
Planning for a bicycle network requires a different approach from that of motorized transportation planning. Bicyclists have different needs from those of motorists, including wider shoulders, better traffic control at intersections, and stricter access management. Often, roadways are designed solely with motor vehicles in mind and Sutton is no exception to this.

By creating a local bicycle infrastructure, members of the community have the ability to travel within Town for employment, shopping, and recreational purposes without driving. The **Bicycle Infrastructure Map**, in the Transportation Chapter, shows the Regional Bicycle Network, as well a proposed Local Bicycle Network here in Sutton.

Goal
To encourage and promote the development and usage of trails within Sutton.

Recommendations
- Publicize the official trails within Town by publishing a brochure, creating a trail-specific map series, and/or by holding special events on the trails.
- Undertake an on-foot survey of all Class VI roads within Town to gauge their ability to sustain certain types of trails usage.
- Ensure that all official town trails are maintained and have proper signage and parking areas.

Goal
To encourage the access to and development of recreational opportunities.

Recommendations
- The Town should consider acquiring access to Blaisdell Lake , Newbury Reservoir, and other large bodies of water so they become accessible to Sutton property owners.
- Establish a permanent Recreation Committee, comprised of various interests within Town, in order to oversee the maintenance of any existing and the creation of new town recreation opportunities.

CONCLUSION

The primary focus of this Chapter is to identify the natural and man-made resources in Town, recognize the role they play in giving the Town of Sutton its character, and decide what strategies would best maintain the character of the Town and conservation of its natural

resources. Most of the Town's resources are interconnected and any change to one may have a significant impact on the others. As the population increases, demands on many of these resources will increase, some to the point of threatening the quality and quantity of the resource. It is the goal of this chapter to help develop a balance between development and resource protection within the Town.

There needs to be the recognition that many natural resources do not stop at the Town's boundaries and that a regional approach may be critical to their long-term protection. Some of our natural resources are considered renewable, such as forests, while others, like soil, are not. Appropriate measures need to be taken to prevent contamination, erosion, depletion and misuse of Sutton's natural resources.

The Town's existing open space consists of forests, fields, and wetlands and surface waters. Most of the development pressure that is currently being felt by the Town is focused on privately owned open space. Because such lands are being targeted for development, it is important that the Town identify critical habitats, greenways, and corridors that should be protected through purchase, easements, or other means. These actions will help to reduce land fragmentation and help maintain the rural, cultural, scenic, and historic character of the Town that makes Sutton the place it is today and the vision of what it wants to be tomorrow.